ROZANOV, F.M., kandidat tekhnicheskikh nauk; KUTEPOV, O.S.; ZHUPIKOVA, D.M.; MOLCHANOV, S.V.; VASIL'YEV, F.F., retsenzent; LYUBIMOV, N.S., retsenzent.

[Structure and designing of fabrics] Stroenie i proektirovanie tkanei. Pod red. F.M.Rozanova. Moskva, Gos. nauchno-tekhn. izd-vo Ministerstva promyshlennykh tovarov shirokogo potrebleniia SSSR, 1953. 471 p. (MLRA 7:6)

(Textile industry)

MOLCHANOV, S.V.; MITROFANOVA, V.I., red.

[Analysis of textile fabrics] Analiz tkanei. Moskva, Vses. zaochnyi in-t tekstil'noi i legkoi promyshlennosti. Pt.1 1965. 63 p. (MIRA 18:12)

FD-3139

USSR/Physics - Optics
MOLCHANOV, V.A.
Card 1/1 Pub. 153 - 14/19

Author : Bonch-Bruyevich, A. M.; Molchanov, V. A.

Title : Diffractional modulator of light

Periodical : Zhur. tekh. fiz., 25, No 9 (September), 1955, 1653-1658

Abstract : The authors state that high-frequency modulators of light of various types are used to measure the velocity of light, to determine distances, to study the duration of the excited state of molecules, etc. In the diffractional modulator use is made of the periodic variation of the intensity of light in diffractional maxima during diffraction of light on standing ultrasonic waves. In the present work the authors' aim is to find the most favorable conditions for the modulation of light and to clarify the peculiarities of operation of the ultrasonic modulator, noting that the complexity of the phenomenon of light diffraction on standing waves does not permit one to obtain by analytical means the necessary notions concerning the real characteristics of a modulator. They discuss standing ultrasonic waves in cuvette for various sources, the variation in depth of modulation of light as function of frequency of voltage strength imposed on quartz, and graph of variation of shift of phase between light signals passing through various portions of the ultrasonic field and through a modulator. Ten references, mostly Western.

Submitted : April 29, 1955

MOLCHANOV, V.A., FABELINSKIY, I.L.

Dispersion of the velocity of sound in carbon disulfide. Dokl. AN SSSR 105 no.2:248-249 '55. (MLRA 9:3)

1. Fizicheskiy institut imeni P.N. Lebedeva Akademii nauk SSSR.
(Sound--Velocity) (Carbon disulfide)

BONCH-BRUYEVICH, A.M.; MOLCHANOV, V.A.

A new optical experiment on relativity. Opt.i spektr. 1 no.2: 113-124 Je '56. (MLRA 9:11)
(Light--Speed) (Relativity (Physics))

BONCH-BRUYEVICH, A.M.; MOLCHANOV, V.A.; SHIROKOV, V.I.

A new phase fluerometer. Izv.AN SSSR Ser.fiz.no.5:596-600 '56.
(Fluerometer) (MIRA 9:9)

MOLCHANOV, V. A.

USSR/Physical Chemistry, Photo Chemistry, Radiation Chemistry, B-10
Theory of Photographic Process.

Abs Jour : Ref Zhur - Khimiya, No 7,1957, 22450.

Author : A. S. Cherkasov, V. A. Molchanov, T. M. Vember, K. G. Voldaykina.
Inst : Not given
Title : Fluorescence duration of anthracene mesoderivatives.

Orig Pub : Dokl. A.N. USSR, 1956, 109, No 2, 292-294.

Abstract : Average durations of fluorescences (τ_e) of anthracene solutions (A) and 46 of its mesoderivatives (alkyl-, aryl-, galogeno-amino-, acetyl-nitro-, methoxy- and a series of others replaced by (A) are measured on a phase-fluorometer in C_2H_5OH at indoor temperature. Values of τ_e for the indicated A- derivatives lie in the range of 1.0-12.0.10^{-9} sec. Values of τ_e divided by the amount of the absolute quantum yield of substances of fluorescence (η) measured in the same conditions, are compared with the maximum span of life of the 1st excited state of τ_a, obtained from the area of the long wave band of absorption of the A derivative solutions. It is shown, that the values τ_e/η and τ_a coincide better if the computation of τ_a will be effectuated on the basis of the formula proposed by

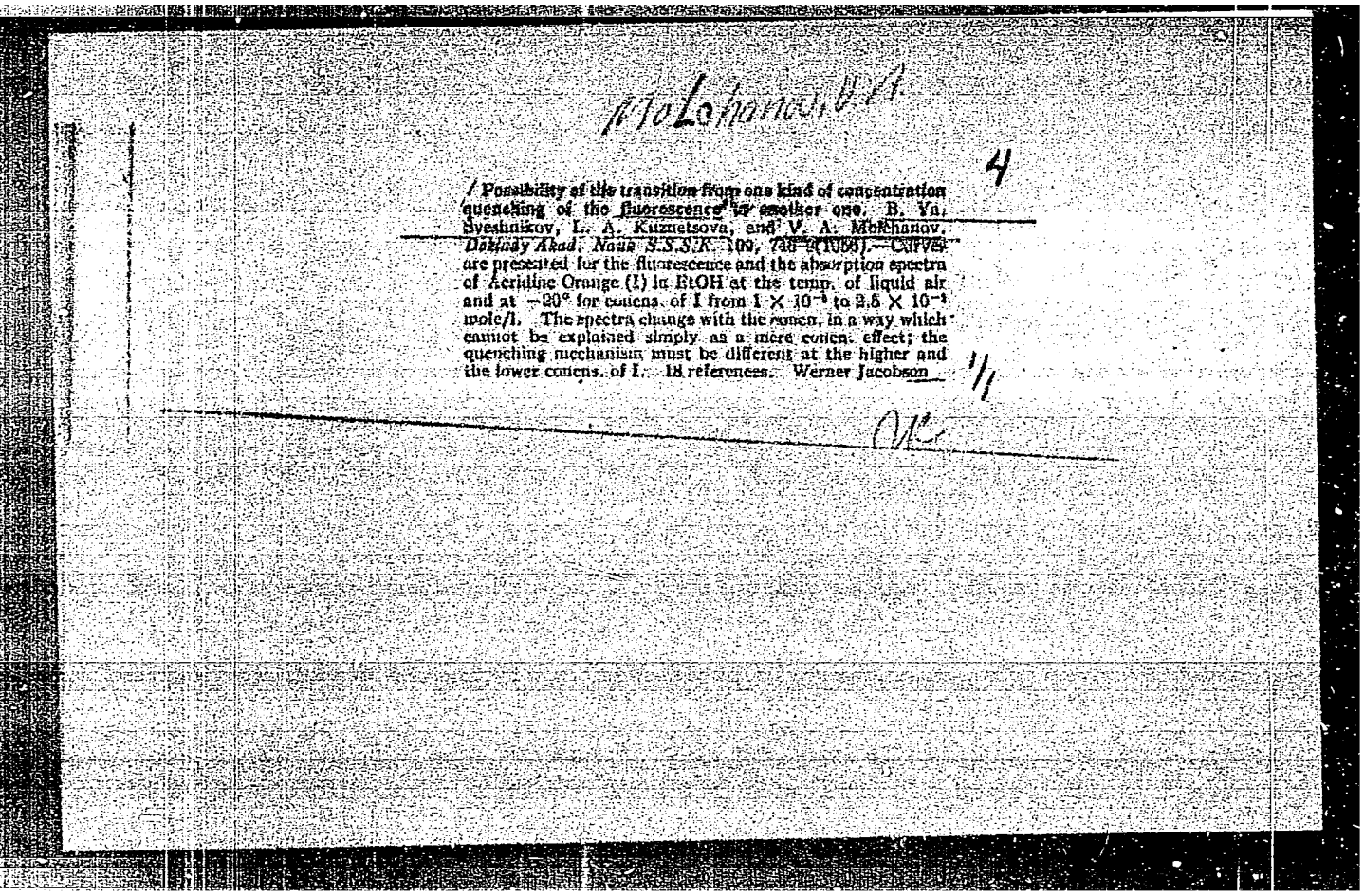
Card 1/2 -151-

USSR/Physical Chemistry, Photo Chemistry, Radiation Chemistry, B-10
Theory of Photographic Process.

Abs Jour : Ref Zhur - Khimiya, No 7, 1957, 22450.

Forster (Forster T. Fluroeszenz organischer Verbindungen, Gottingen 1951, S.158) than by usual formula of Kravz-Einstein. τ_a and $\tau_{e,n}$ (n concords well in case of derivatives at which n is greater than at A). The diminishing of the value of τ, $\tau_e/n > \tau_a$ in case of substitutes is explained in this case by the presence of damping, not related to the decrease of τ.

Card 2/2 -152-



Possibility of the transition from one kind of concentration quenching of the fluorescence to another one. B. Ya. Sveshnikov, L. A. Kuznetsova, and V. A. Mokhanov. *Doklady Akad. Nauk S.S.S.R.* 109, 748–9(1956).—Curves are presented for the fluorescence and the absorption spectra of Acridine Orange (I) in EtOH at the temp. of liquid air and at −20° for concns. of I from 1×10^{-3} to 3.5×10^{-3} mole/l. The spectra change with the concn. in a way which cannot be explained simply as a mere concn. effect; the quenching mechanism must be different at the higher and the lower concns. of I. 18 references. Werner Jacobson

SOV/120-59-2-15/50

AUTHORS: Bonch-Bruyevich, A.M., Karazin, I.V., Molchanov, V.A., and Shirokov, V.I.

TITLE: An Experimental Model of a Phase Fluorometer (Eksperimental'nyy obrazets fazovogo fluorometra)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 2, pp 53-56 (USSR)

ABSTRACT: This paper was read at the VI Conference on luminescence in Leningrad. The instrument was exhibited at the Brussels Exhibition in 1958. A finalized laboratory model of a new phase fluorometer is described. The phasemeter section has a resolution of 0.1°, which corresponds to 2×10^{-11} sec at the modulation frequency used. The sensitivity to light is high, and is such that emissions many orders of magnitude weaker than that of fluoresceine in alkali can be measured. Several laboratory fluorometers have been described for measuring fluorescence decay times in the 10^{-8} - 10^{-10} sec range, (Refs 1-5). The methods are based on measuring the phase difference φ between the emission and the exciting light. The exponential decay constant τ is related to φ by $2\pi F\tau = \tan \varphi$

Card 1/8

An Experimental Model of a Phase Fluorometer

where F is the modulation frequency. In 1954 the authors designed a phase fluorometer in which many sources of error were eliminated; a phase detector, and other devices to facilitate the measurements, were incorporated (Refs 6-8). The instrument described here has been designed on the basis of four years' experience with the 1954 instrument, and in certain respects differs considerably from that instrument. The instrument consists of two main parts, both of which are built into the same console, namely the optical section and the phasemeter system (Fig 1). The apparatus includes units that supply the phasemeter, control the modulator, feed the amplifiers, etc. The optical system is fitted on a horizontal table and is divided into three sections closed by light-tight covers. The phasemeter system is installed in the vertical rear section; the stabilized supplies (rectifiers, etc) and the modulator unit are fitted in the base of the console. The resolution is about 0.1°. The minimum error of a single measurement of τ for a bright emission (for low noise levels) is less than 2% (apart from systematic errors); the general

An Experimental Model of a Phase Fluorometer

errors are

5% at τ = 10^{-9} to 10^{-8} sec;

10% at τ = 5.10^{-10} to 5.10^{-8} sec;

20% at τ = $2.5.10^{-10}$ to 10^{-7} sec.

The high sensitivity to light enables one to use emissions that are 3-4 orders of magnitude weaker than the emission from a 10^{-4}M solution of fluorscein in alkali. The error increases as the brightness decreases. The light source is a high-pressure mercury arc SVDSh-250 (Fig 2). A diffraction modulator is used to modulate the light flux, for which purpose we have used standing waves generated by a barium titanate plate, (Ref 9) in aqueous ethanol (17%). The plane of the exit slit can be projected in magnified form on a special fluorescent screen (Fig 2) during adjustments; the modulator can thereby be adjusted for visible or ultra-violet light. Instability caused by incorrect beam-splitting (Ref 10) is avoided by inserting filters separately in the two channels. The light entering the sample channel (some 95% of the total output from the

An Experimental Model of a Phase Fluorometer

modulator) enters the middle section of the instrument and strikes either a scatterer or the specimen. The scattered exciting light is used in setting-up; normally the fluorescence is recorded by a photomultiplier (FEU-18, FEU-19, FEU-22 or FEU-25), whose output feeds the specimen channel. The scatterer and the sample are fixed to a moving table. A filter is fitted between the sample and the multiplier to cut out the exciting light. The table is driven by a motor, and can turn or reciprocate. Twelve stops give positions where the table comes to rest. At each stop position a neutral filter is automatically inserted in the exciting beam. These filters are used to match the intensities of the exciting and fluorescence beams roughly, in order to avoid amplitude-dependent phase errors caused by the photomultiplier (Ref 8). These neutral platinum filters are contained in a special holder, and any appropriate number of them can be introduced with the cover of the section closed. The filters are such as to give a maximum attenuation of about 10^4, and to match the intensities to about 20%. The phasemeter system is a symmetrical

An Experimental Model of a Phase Fluorometer

two-channel one (Fig 3). The signals are amplified at two frequencies (436 and 25 kc/s). The system enables one to select the best operating frequency (6.5±0.15 Mc/s) and to keep it constant within the stability of a quartz oscillator. To this end the frequency of a tunable oscillator (F_1 = 4.018±0.150 Mc/s) is heterodyned with quartz oscillators (F_2 = 2.5 Mcps and F_3 = 2.282 Mc/s) in two mixers. The output from one mixer (F_1+F_2) is fed to the modulator, whilst the output from the second mixer is doubled in frequency (because the light is modulated at a frequency double that of the supply voltage) and is fed to the first mixers in the two channels. The first working frequency is thus $2(F_2-F_3)$, which does not depend on F_1; its stability is determined by the stabilities of F_2 and F_3 only. The second working frequency is correspondingly stable. Any change in phase at one of the inputs is accompanied by an equal change of phase difference at the outputs of the amplifying channels. The quartz oscillators increase the stability of the phase reading and of the calibration of the phase shifters (which work at 25 kc/s) without

An Experimental Model of a Phase Fluorometer

substantially increasing the complexity. Bridge-type phase-shifters are used; the output voltage is not affected by changes in the phase shift. One channel has an uncalibrated phase-shifter with a total range of 360° (it is used to set the zero on the exciting light); the other channel has three standard decade shifters, with steps of 10°, 1° and 0.1° respectively. These three units provide a shift of 180° in equal steps. A phase-shift cutout is fitted, to remove the shift introduced by these units. The cutout is operated manually or automatically when the zero is being set. In this way ϕ can be measured repeatedly without disturbance to the knobs on the phase-shifters; this improves the convenience and the accuracy. The automatic gain control keeps the signal level constant in parts of the circuit where amplitude-dependent phase errors are most likely (Ref 6). The AGC stages are designed not to produce parasitic phase shifts for input signals within the range 50 μv (threshold) to 50 mV, (Ref 8). The control coefficient of the AGC system is about 5000. The manual gain control is used to prevent overloading

Card 6/8

An Experimental Model of a Phase Fluorometer

on bright emissions. Electronic voltmeters in the AGC circuits indicate the signal levels; these meters are used to equalize the signals in the two channels roughly. There are two output indicators, namely an oscilloscope and a phase-sensitive detector with a meter. The oscilloscope is used only for rough measurements, and to indicate the noise level. The phase-sensitive detector is used as a null indicator. The time-constant and sensitivity of this detector are adjustable; the values are chosen in accordance with the noise level. So far as we are aware, this is the first fluorometer to have reached a finalized laboratory form. D.N. Kaydinov and M.S. Gitman helped in building the apparatus and in designing the phase-meter sections; to them we offer our thanks. We also wish to thank V.P. Kovalev, who did much to help in finalizing the phasemeter design.
This is a complete translation, apart from Fig 3.
There are 3 figures and 10 references, of which 2 are English, 1 is German and 7 are Soviet.

Card 7/8

Figure captions are: Fig 1, general view of the fluorometer. Fig 2, 1) SVDSh-250 lamp, 2) condenser

An Experimental Model of a Phase Fluorometer

system, 3) entrance slit, 4) exit slit, 5) condenser lens, 6) exit lens, 7) modulation cell, 8) fluorescent screen, 9) mirror used to observe diffraction pattern, 10) filter to select exciting wavelength, 11) stop, 12) beam-splitter, 13) scatterer, 14) photomultiplier in channel II, 15) scatterer or specimen, 16) photomultiplier in channel I (sample), 17) moving stage, 18) filter, 19) lens, 20) set of neutral filters.

Card 8/8

ASSOCIATION: Gosudarstvennyy opticheskiy institut (State Optical Institute)

SUBMITTED: June 2, 1958

21208

S/188/61/000/001/003/009
B108/B209

26.2322

AUTHORS: Molchanov, V. A., Tel'kovskiy, V. G.

TITLE: A mass monochromator with double focusing in a sectorial magnetic field

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya 3, fizika, astronomiya, no. 1, 1961, 22-28

TEXT: In the laboratoriya kafedry atomnoy fiziki Moskovskogo universiteta (Laboratory of the Department of Atomic Physics of Moscow University), a mass spectrometer has been designed which delivers an ion current of a few milliamperes at an accelerating voltage of up to 35 kv. In this paper, a similar device is described, intended for ion-beam experiments as well as for the separation of small quantities of isotopes. In work with high ion-current densities, ion sources of an aperture of a few millimeters must be used and, consequently, a dispersion of 1 cm for a relative mass difference of 1% was chosen. The weight of the magnet which should not exceed 2 tons sets a limit for the power of the source. The magnet of the device under consideration was designed in the form of a sector with a

A mass monochromator with...

central angle of 67°. In order to attain high current density and dispersion, an axially symmetric magnetic field with horizontal and vertical focusing was used. In the calculation of the monochromator, the authors employed Malov's method (Ref. 4: Baranov S. A., Malov A. F., Shlyagin K. N. PTE, no. 1, 3, 1956). The edges of the field change the angle through which the ion beam enters the sector, and shift the beam sideward, but both effects cannot be determined accurately. Therefore, the authors used a field which is proportional to $r^{1/2}$ (r denotes the radius of the sectorial magnet) in the center of the sector, since such a field can accomplish double focusing for any r without astigmatism, so that a lateral displacement of the beam is insignificant. The magnet (except for the profile of the pole ends) was calculated in linear approximation. The initial quantities were the dispersion, the maximum energy (35 kev) of the single-charged ions (mass 200 absolute units), and the angular divergence of the beam. The magnet is made of Armco iron. Its windings are copper pipes through which water is conducted; the current density in these windings reaches 6 a/mm^2. The magnet is fed by d-c of 100 a and 200 v, stabilized to 0.01%. The vacuum system (Fig. 1)

S/188/61/000/001/003/009
B108/B209

A mass monochromator with...

essentially consists of three sections, viz., the chamber with the ion source, the monochromator plus ion ducts, and the fission chamber; each of these sections is evacuated to 10^{-6} - 10^{-7} mm Hg by an H-2T (N-2T) pump (2000 l/sec). The ion-source chamber is made of brass, and all the other parts of copper. The ion-source chamber, the ion ducts, and the monochromator are cooled by running water. The diaphragms 6 are made of stainless steel. A special jacket in the fission chamber provides nitrogen temperatures. By this vacuum system, a pressure drop by about 100 times could be attained between ion-source chamber and fission chamber. The ion source consists of a water-cooled discharge cylinder with a tungsten cathode which is heated by electron bombardment from an incandescent wire. The electrons emitted from the tungsten cathode into the discharge cylinder oscillate in the longitudinal magnetic field which is applied between cathode and first lens, thus causing strong ionization of any gas or vapor conducted into the cylinder. The ion beam is focused by two lenses, the first of which has a negative potential with respect to earth, and the second has earth potential. The high voltage was stabilized to 0.01%. Such an ion source delivers a current of 50 - 70 ma with a divergence of not more than 5°. In essential, this source is

Card 3/6

A mass monochromator with...

analogous to that designed by L. A. Artsimovich (Ref. 7: "Atomnaya energiya", III, 483, 1957) et al. Since the exact deflection of the ion beam could not be calculated, a stainless steel siphon (Fig. 1, no. 8) was inserted between the monochromator and the second ion duct. Optimum focusing was attained at an angle of 85°; the distance between source and magnetic pole end was 1400 mm. Readings are taken from an aluminum screen on which the focused ions leave clear marks. For a qualitative determination of the resolution of this device, a mass spectrogram of Xe was taken. The principal characteristic of this device is the fact that dispersion does not depend on the angle of deflection of the beam since the distance between magnet and focus is diminished by narrowing down the angle. At a voltage of 35 kv, a current density of 2 - 3 ma/cm^2 may be attained at the target. The high resolution and good dispersion permit preparing isotopic targets of almost any element. The authors thank Academician L. A. Artsimovich for interest, A. F. Malov for help in the calculation of the magnet, and V. M. Kel'man and D. L. Kaminskiy for valuable advice. There are 3 figures, 1 table, and 7 references: 6 Soviet-bloc and 1 non-Soviet-bloc.

Card 4/6

S/188/61/000/001/003/009
B108/B209

A mass monochromator with...

ASSOCIATION: NIIYaF kafedra atomnoy fiziki (Scientific Research Institute of Nuclear Physics, Department of Atomic Physics)

SUBMITTED: July 18, 1960

Card 5/6

A mass monochromator with...

Legend to Fig. 1: 1 - chamber with ion source, 2 - coil generating the longitudinal magnetic field in the discharge cylinder, 3 - N-2T pumps, 4 - window, 5 - ion ducts, 6 - diaphragms, 7 - mass monochromator, 8 - siphon, 9 - fission chamber.

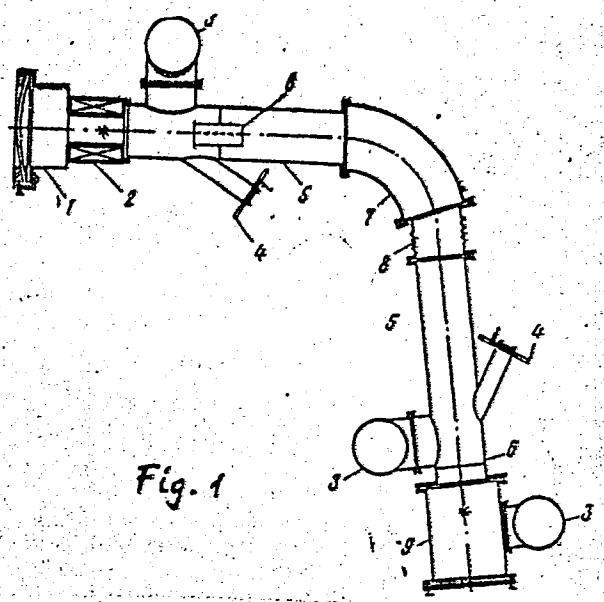


Fig. 1

Card 6/6

24415
S/051/61/011/001/002/006
E036/E435

24,3500

AUTHORS: Bonch-Bruyevich, A.M., Kariss, Ya.E. and Molchanov, V.A.

TITLE: Microscopic studies of electroluminescence in ZnS-Cu, Al single crystals

PERIODICAL: Optika i spektroskopiya, 1961, Vol.11, No.1, pp.87-93

TEXT: The authors describe apparatus for carrying out microscopic studies on electroluminescence in single crystals. A method of synchronous signal accumulation with variable phase is used. It was possible to study the form of the luminescent pulse in separate regions of the crystal and to measure their amplitude. Preliminary experiments demonstrated that it is possible to distinguish the light pulse obtained on switching on, and on switching off, the field in ZnS-Cu,Al single crystals. Some regularity was observed in the distribution of the ratios of the amplitudes of these pulses in different parts of the crystal. Observation of the electroluminescence under the microscope makes it possible to compare characteristics of the electroluminescent condenser with light emitted from active parts of the crystal (Ref.3: K.Buttler, J.Waymonth. Brit.J.Appl.Phys., suppl. No.4,

Card 1/6

Microscopic studies ...

33, 1955). Also, information may be obtained about the structure of the crystal in the emitting regions (Ref.1: J.Waymonth, F.Bitter. Phys.Rev., 95, 941, 1954). The hexagonal crystal with linear dimensions of about 60 μ is mounted in a mixture of melamine formaldehyde and resin together with two pointed electrodes and placed at the focal plane of the microscope objective and could be moved in two perpendicular directions. A series of square pulses with separation of 10^{-3} sec and variable length and amplitude (U) were applied to the specimen. A diaphragm in the focal place of the eye-piece restricted the emitting region to dimensions of the order of 10 μ which was controlled visually using a prism. The light through the optical microscope passed to a photo-electric multiplier and the signal from this to a special monitor stage. This stage only transmitted the signal in the short time t_o remaining in the time t_1 from the moment of application of the voltage to the sample. t_1 is smoothly changed from $t_{1\,min} \sim 10 - 15$ μ sec to $t_{1\,max} > t'$ synchronously with the voltage change of oscilloscope scanner. The period of this variation (T_2) is much greater than

Microscopic studies ...

the period of the alternating signal taken from the photo multiplier load (in this case 10^4 times). The time constant of the integrating circuit (τ_i) following the monitor stage was selected such that $T_1 \ll \tau_i \ll T_2$. This significantly reduces the interference and slightly distorts the signal. The generator 26-И (26-I) and the phantastron ensure that the monitor stage and pulse generator are synchronized. Fig.1 shows the block circuit diagram of the apparatus for observing luminescence under the microscope (1 - sample; 2 - objective 40x; 3 - filter; 4 - diaphragm; 5 and 6 - eyepieces 15x). The phantastron controls the voltage form of the oscilloscope scanner and provides the trigger for the generator 26-I. This causes the pulse fed to the monitor stage to be gradually displaced in phase relative to that fed to the sample. With this equipment the details of the two light pulses are clearly revealed and their amplitude can be measured. Preliminary experiments showed that close to the electrode whose potential was raised, the "switching on" pulse was larger than "switching off" pulse whilst the ratio is reversed near the other electrode. In the centre the amplitudes of the pulses are similar. The decay of luminescence in parts of the crystal is

compared to that of the whole condenser. In particular the region where only "switch on" light pulse is observed is examined. It is also known that if the voltage pulse is sufficiently short the second light pulse is not observed. The decay of the first pulse being accelerated. This decay is plotted for the crystal near the electrode for the whole crystal and the electroluminescent condenser of the same crystal. The complicated type decays are all similar apart from a slower fall in the condenser which may be due to reabsorption or crystal non-uniformities, the experimental crystals being specially selected. The integrated luminescence was found proportional to $\exp(B/U_m^{1/2})$, where U_m is the applied voltage and B a constant, for both the condenser and the separate crystal. The results suggest a mechanism involving recombination radiation as the electrons return to a region of strong ionization which is in contradiction to the mechanism of excitation of the luminescent centres proposed by R.Zallen et al (Ref.15: J.Electrochem. soc., 107, 288, 1960). This point and the coincidence of the dependence of the light pulse amplitude on the voltage amplitude for the various sections of the crystal and the

Microscopic studies ...

electroluminescent condenser show that the laws governing light emission do not become more complicated by the change from single crystal to polycrystalline samples. There are 6 figures and 15 references: 4 Soviet-bloc and 11 non-Soviet-bloc. The four most recent references to English language publications read as follows: J.Waymonth, F.Bitter. Phys.Rev., 95, 941, 1954;
K.Buttler, J.Waymonth. Brit.J.Appl.Phys., suppl.No.4, 33, 1955;
P.Zalm. Phil.Res.Rep., 11, 353, 1956;
R.Zallen, W.Eriksen, H.Ahlburg. J.Electrochem.soc., 107,228,1960.

SUBMITTED: July 14, 1960

Card 5/6

S/048/61/025/004/017/048
B104/B201

24.3500

AUTHORS: Bonch-Bruyevich, A. M. and Molchanov, V. A.

TITLE: Study of electroluminescence pulses of a ZnS-Cu,Al luminophore with high copper concentrations

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 4, 1961, 482-487

TEXT: The present paper has been read at the 9th Conference on Luminescence (Crystal Phosphors), Kiyev, June 20-25, 1960. The authors studied the characteristics of electroluminescence in the green and blue emission band of a ZnS-Cu,Al electroluminophore with high copper concentrations (0.2 g/g). The specimens were prepared by F. M. Pekerman, to whom thanks are expressed. The luminophore was dipped into a capacitor with cable oil, the luminophore was 60 μ thick, the capacitor had a transparent electrode. Square-wave pulses were applied to the capacitor, the pulse period was 10^{-2} seconds, voltage rise and drop lasted 2-3 microseconds. Duration and amplitude could be varied in a wide range. The luminescence kinetics was observed by an oscilloscope. Results are collected in five diagrams. The drop of

S/048/61/025/004/017/048
B104/B201

Study of...

luminescence in the switching off and switching on pulses does not obey an exponential law, nor a hyperbolic one, as has been stated some time in the past. The drop of luminescence in switching on and switching off pulses to half the intensity is independent in both bands of the duration of voltage pulses, once these are longer than 30 microseconds. The authors believe that the switching off of the voltage is accompanied by a reduction of the luminescence, excited by it, in the green spectral region, and that this effect can be explained by the well-known mechanism of electroluminescence. They conclude from results regarding blue bands that the excitation of this band is not associated with the recombination of electrons. A microscopic analysis has shown that the luminescence rules represented in the diagrams do not render the use of polycrystalline electroluminescence capacitors more complicated. There are 6 figures and 14 references: 6 Soviet-bloc and 8 non-Soviet-bloc. The three most recent references to English-language publications read as follows: Ref. 5: Nudelman S., Matossi F., J. Electrochem. Soc., 101, 546 (1954). Ref. 6: Matossi F., Nudelman S., Phys. Rev., 99, 1100 (1955). Ref. 11: Franke D., Phys. Rev., 110, 1540 (1958).

Card 2/5

Study of...

Legend to Fig. 1: Half-life of luminescence intensities of switching on ($\tau_1^{1/2}$) and switching off pulses ($\tau_2^{1/2}$), of amplitudes I_{m_1} and I_{m_2}, and of light sums L for two luminophores of the duration of voltage pulses in the green band.

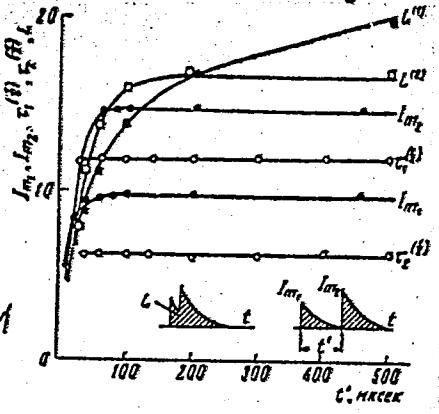


Fig. 1

Legend to Fig. 2: The same as Fig. 1, as applying to the blue band.

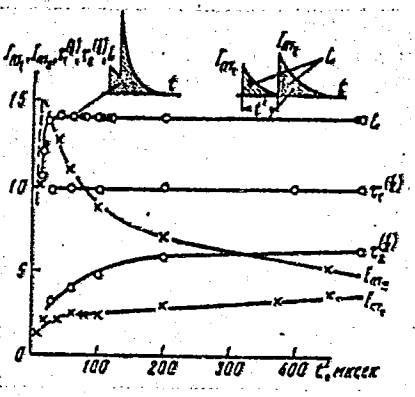
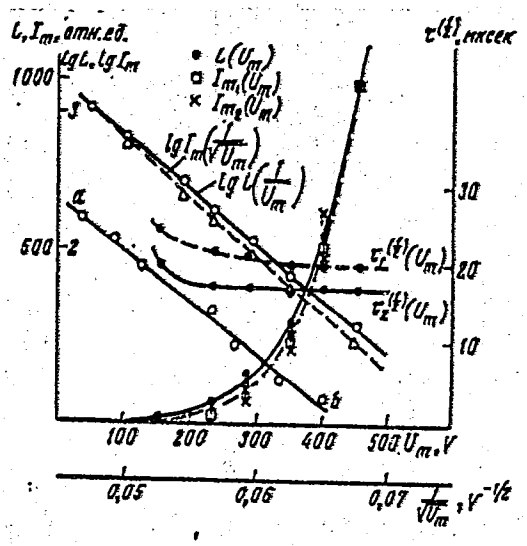


Fig. 2

Card 3/5

Study of...

Legend to Fig. 3:
Quantities concerned as functions of the amplitude of voltage pulses in the green band.



Card 4/5

Study of...

Legend to Fig. 4: The same for the blue band.

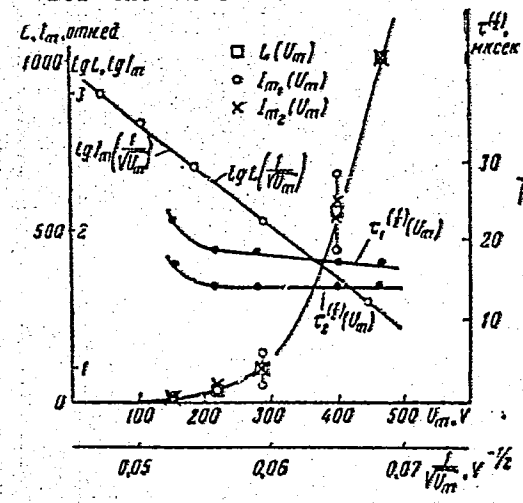


Fig. 4

Card 5/5

Legend to Fig. 5: Luminescence drop of part of a crystal (1), of the whole crystal (2), and of the electroluminescent capacitor (3) for different voltage values (green band).

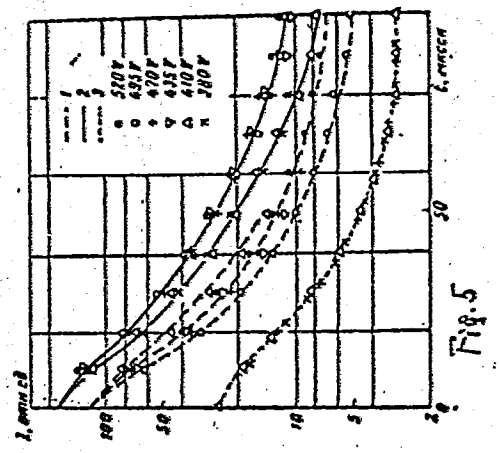


Fig. 5

DUSHKOV, I.I.; MOLCHANOV, V.A.; TEL'KOVSKIY, V.G.; CHICHEROV, V.M.

Some angular relationships in cathode sputtering. Zhur.tekh.fiz. 31 no.8:1012 Ag '61. (MIRA 14:8)
(Sputtering (Physics))

S/020/61/136/004/009/026
B019/B056

AUTHORS: Molchanov, V. A. and Tel'kovskiy, V. G.

TITLE: Change in the Coefficient of Cathode Sputtering as a Function of the Angle of Incidence of Ions Upon the Target

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 4, pp. 801 - 802

TEXT: The authors present the results of a study of the cathode sputtering of polycrystalline Cu specimens by argon ions having an energy of 27 kev. The ions incided at an angle of 0 - 84°. Some of the Cu specimens had a minimum of impurities, while others were produced from commercial copper. The purification of the surface was carried out by annealing at 750 - 800°C, whereby the grain size increased somewhat. The experiments were carried out with a device similar to a mass spectrograph with double focusing of the ion beam in a magnetic field. The ion beam had a current density of 1-2 ma/cm^2, and the target was heated to nitrogen temperature, the pressure round the target amounting to $1\text{-}2\cdot10^{-7}$ mm Hg. Fig.1 shows the coefficient of cathode sputtering for a perpendicular ion

Card 1/3

incidence; Fig.2 shows the coefficient as a function of the angle of incidence (curve 1). In addition, this figure shows the product of the coefficient with the cosine of the angle of incidence (curve 2). Thorough investigations showed that up to an angle of incidence of 70°, up to which the cosine law is satisfied (curve 2), the energy loss caused by particle reflection vanishes within the accuracy of measurement. The increasing energy loss above 70°, caused by particle reflection, corresponds to the decrease of the cathode-sputtering coefficient. The energy loss was measured with a special electrode, to which a thermocouple had been fastened. Furthermore, it was found that apart from the energy loss caused by particle reflection, also other factors must be taken into account for the reduction of the cathode-sputtering coefficient. There are 2 figures and 8 references: 2 Soviet, 3 US, 1 German, 1 Italian, and 1 Dutch.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: August 17, 1960, by L. A. Artsimovich, Academician

SUBMITTED: July 25, 1960

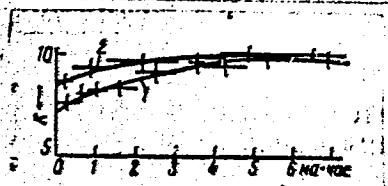


Рис. 1 [Fig. 1]

S/020/61/136/004/009/026
B019/B056

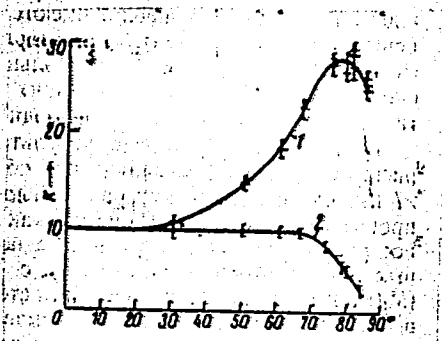


Рис. 2 [Fig. 2]

Legend to Fig.1: Cathode-sputtering coefficient for perpendicular incidence of commercial copper (curve 1) and chemically pure copper (curve 2).

Legend to Fig.2: Sputtering coefficient as a function of the angle of incidence (curve 1) and the product of this coefficient with the cosine of the angle of incidencesas a function of this angle.

Card 3/3

S/020/61/137/001/010/021
B104/B209

AUTHORS: Molchanov, V. A., Tel'kovskiy, V. G., and Chicherov, V. M.

TITLE: Anisotropy of cathode sputtering of single crystals

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 1, 1961, 58-59

TEXT: This article presents the results of measurements concerning the dependence of the sputtering coefficient of the (100) face of nickel and copper single crystals on the angle of incidence of ions. The experimental setup has been described in an earlier paper (Ref. 3: V. A. Molchanov, V. G. Tel'kovskiy, Vestn. Moskovsk. univ., v. 1 (1956)). Sputtering was done with singly-ionized 27-kev argon ions; current density was 1-2 ma/cm^2. The single crystals were polished and then annealed for some time in a vacuum furnace at about 800°C. After this, they were slowly cooled down to room temperature, and their surfaces were chemically etched. Surface condition and orientation of the crystals were examined by X-ray structural analysis. The sputtering coefficients (atoms/ion) are plotted versus the angle of incidence in Figs. 1 and 2. Curve 1 in Fig. 2 was taken at a Cu single crystal, curve 2 in Fig. 2 at polycrystalline copper.

Card 1/3

The results of analogous measurements with a nickel single crystal are shown in Fig. 3. The results found with these two single crystals are very complicated. The position of the minima is the same for both single crystals and corresponds to the angles of incidence of the ion beam, which coincide with the crystallographic axes (100), (111), and (112). The authors note the non-monotonic dependence of secondary-electron emission on the angle of incidence which differs for copper by more than twice the amount at an angle of incidence of 36° and 48°. The single crystals used in the experiments described here were grown at the Institut kristallografii AN SSSR (Institute of Crystallography AS USSR) under the supervision of V. A. Timofeyeva, who is thanked by the authors. Moreover, the authors thank Ye. V. Kolontsova, I. V. Telegina, and N. A. Khatanova for having determined the orientation of the single crystals, as well as I. I. Dushkov for assistance. There are 3 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University imeni M. V. Lomonosov)

Anisotropy of cathode...

S/020/61/137/001/010/021
B104/B209

PRESENTED: December 17, 1960, by L. A. Artsimovich, Academician

SUBMITTED: December 10, 1960

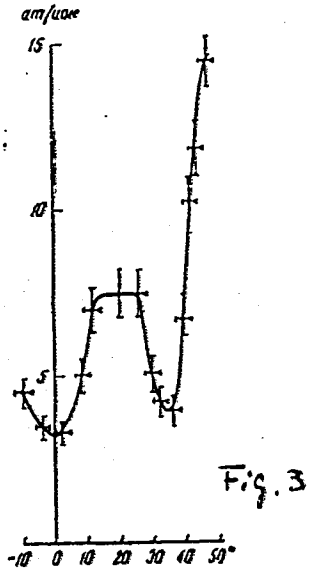


Fig. 3

Card 3/3

24049

24.7200

S/020/61/138/004/009/023
B104/B203

AUTHOR: Molchanov, V. A., Tel'kovskiy, V. G., and Chicherov, V. M.

TITLE: Angular distribution of sputtered particles in irradiation of a single crystal by an ion beam

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 4, 1961, 824 - 825

TEXT: The experiments reported here were made with an experimental arrangement described in one of the authors' previous papers (Vestn. Mosk. univ., no. 1, (1961)) and schematically shown in Fig. 1. The ion beam 1 passes a diaphragm 2 and hits the crystal 3. As a collector served the base of the X-ray film which was attached either to a plane (4a) or a curved (4σ) copper plate. Fig. 2 shows a photograph of the deposits on the collector, obtained in the irradiation of the (100) plane of a copper single crystal with an argon beam of the energy of 27 kev. The four symmetric patterns correspond to the crystallographic axes [110], and the fifth in the center to the [100] axis. The arrows give the directions in which the deposits were photometrically determined. Figs. 3 and 4 show the results. The different curves correspond

Card 1/6

Angular distributions ...

to different R_0 d (d = diameter of the ionic beam on the crystal), and angles of incidence α of the ionic beam. As can be seen, a considerable part of the atoms leaving the target lie within narrow cones whose axes coincide with the crystallographic principal axes of the target. The angular half-width is 20^0. The authors state that the "intensity" of the Wehner patterns greatly depends on the angles between the crystallographic principal axes and the sectional plane of the crystal. If the sectional plane of the crystal is none of the crystallographic principal planes, then the more intensive patterns lie in the directions forming smaller angles with the normal of the sectional plane. The authors thank I. A. Shakh-Melikova for assistance in the experiments. There are 4 figures and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc. The 2 references to English-language publications read as follows: G. K. Wehner, Phys. Rev., 102, 690 (1956); G. K. Wehner, G. S. Anderson, J. Appl. Phys., 31, 2305 (1960).

Card 2/6

24049
S/020/61/138/004/009/023
B104/B203

Angular distributions ...

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University imeni M. V. Lomonosov)

PRESENTED: March 4, 1961, by L. A. Artsimovich, Academician

SUBMITTED: February 28, 1961

Card 3/6

GANZ, S.N.; BRAGINSKAYA, R.I.; GORODETSKIY, N.I.; LOKSHIN, M.A.
Prinimali uchastiye: SLASHCHEVA, V.M.; MOLCHANOV, V.A.;
OVCHARENKO, B.G.

Absorption of nitrogen oxides by milk of lime in mechanical absorbers of a pilot plant. Izv.vys.ucheb.zav.; khim.i khim. tekh. 5 no.1:155-159 '62. (MIRA 15:4)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut imeni F.E.Dzerzhinskogo, kafedra tekhnologii neorganicheskikh veshchestv.
(Nitrogen oxides) (Lime)

S/048/62/026/011/005/021
B125/B102

24.6760
24.7000
26.2312

17

AUTHORS: Molchanov, V. A., and Tel'kovskiy, V. G.

TITLE: Angular characteristics of the destruction of metals by ion beams

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 11, 1962, 1359-1365

TEXT: The Kafedra atomnoy fiziki Moskovskogo universiteta (Department of Atomic Physics of Moscow University), which has been investigating the angular dependence of the destruction of metals by ion beams since a number of years, pays special attention to the case when the ion beam falls at very small angles upon the metal surface. The results of these studies are of great technical importance, such as in the design and construction of thermonuclear reactors. The experimental arrangement consisted of a large mass spectrometer with a doubly focused ion beam in a sectorial magnetic field. The angular convergence of the ion beam is small, and the pressure of the background gas near the focus of the device is low. Although previous investigations were carried out with great

Angular characteristics of ...

care, their results differed greatly. The influence of the roughness (degree of destruction) of the irradiated surface may be seen from the fact that the sputtering coefficient of a single crystal is independent of the duration of bombardment and of the degree of surface contamination. The sputtering coefficients of "smooth" and "destroyed" polycrystalline surfaces differ considerably; for example, in the case of commercial copper they differ by 25%. At present, it is not yet possible to infer the mechanism of destruction from experimental results. The sputtering coefficient increases in inverse proportion to the cosine of the angle α at which the ions strike the target. Deviations from this cosine law, occurring at large angles of incidence, are neither due to the reduced transfer of ion energy to the target nor to the effect of the microrelief of the specimen. The sputtering coefficient is a non-monotonic function of α, but drops sharply when the direction of the ion beam approaches the crystallographic axes of the target. For this reason, grains with properly directed major axes are not destroyed on the sputtered surface. The density of the deposition on a spherical collector with its center in the middle of the irradiated specimen is proportional to the angular distribution of the sputtered particles. In the neighborhood of the

Card 2/3

Angular characteristics of ...

{110} axis, the density of the deposited particles shows a Gaussian distribution with a half-width of 20°. The radiative mechanism proposed for the destruction of metals is almost indubitably correct. The problem under consideration was suggested by L. A. Artsimovich.

Card 3/3

37274
S/057/62/032/005/022/022
B104/B102

21,7000
17.2400

AUTHORS: Molchanov, V. A., Tel'kovskiy, V. G., and Shakh-Melikova, I. A.

TITLE: Effect of the target temperature on the angular distribution of sputtered particles on irradiation of a single crystal by an ion beam

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 5, 1962, 647-648

TEXT: The effect of radiation damage of a single-crystal lattice on the angular distribution of particles emitted from the crystal on irradiation with ions is explained. It is assumed that when lattice imperfections are present the spot of an X-ray diffraction pattern contracts on increasing the target temperature. The deposits of the sputtered substance are photometered. The width of the spots alters very little for target temperatures between 150 and 700°K. A flat minimum of the spot widths lies approximately in the middle of the temperature range, i.e., at $\sim\frac{150+700}{2}$ °K. For ion current densities of 1 ma/cm^2 and radiation doses of 2-3ma·hr/cm^2 there is no marked broadening of the angular distribution due to radiation

Card 1/2

S/057/62/032/005/022/022
B104/B102

Effect of the target temperature...

damage of the lattice if the temperature is not too low. There is 1 figure.

SUBMITTED: July 3, 1961

Card 2/2

S/057/62/032/008/014/015
B104/B102

AUTHORS: Yendzheyets, G., Molchanov, V. A., Tel'kovskiy, V. G., and Faruk, M. A.

TITLE: Angular distribution of evaporated particles in the irradiation of single crystals with an ion beam

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 8, 1962, 1032 - 1035

TEXT: The angular distribution of the particles produced when the (100) faces of copper and nickel single crystals were irradiated with argon and neon ions was measured. The diameter of the single crystal surface irradiated was smaller than 8 mm, the distance between target and collector 95 mm. The target temperature was lower than 100°C, the angle of incidence of the ions 20°. After irradiation five Wehner spots became visible on the collector: four at the corners corresponding to the (110) axis, and one in the center which corresponded to the (100) axis. The density of the spots was determined photometrically. (Fig. 1). The angular distribution of particles and that of the sputtering coefficient do not depend on mass and energy of the ions. There are 3 figures.

Card 1/2

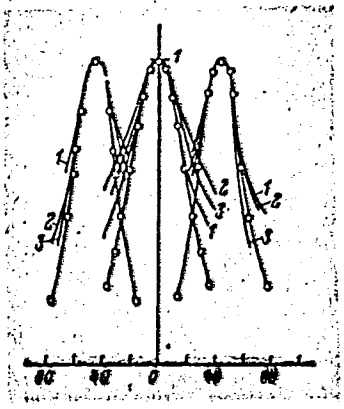
S/057/62/032/008/014/015
B104/B102

Angular distribution of...

ASSOCIATION: MGU

SUBMITTED: October 24, 1961

Fig. 1



Card 2/2

24.6600

41334
S/020/62/146/003/010/019
B101/B144

AUTHORS: Mashkova, Ye. S., Molchanov, V. A.

TITLE: Angular distribution of fast particles emerging from a metal surface irradiated by an ion beam

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 3, 1962, 585-587

TEXT: Copper, tungsten, or graphite targets were bombarded with 30-kev Ar^+ ions, current density 1 ma/cm^2, at an angle of incidence θ near the sliding angle. The ionic current I_1 of the ions reflected under different angles φ was measured. As the greater part of the argon ions was neutralized on the target, the neutralized component of the reflected fast particles was determined by measuring the current I_2 of the secondary electron emission, after the manner of H. J. Montagne (Phys. Rev., 81, 1026 (1951)). The curves for the angular distribution had the same appearance for all targets. For $\varphi < \theta$, no current occurred; as from $\varphi = \theta$, the current increased rapidly, reached a maximum, and then decreased steadily. After passing the maximum, the curves for the same target nearly coincide. The

Card 1/2

current increase is caused solely by microrelief of the target. Comparison with the curve for the differential effective cross section of scattering, calculated on the assumption of nonrecurrent collisions of free particles interacting in accordance with the Coulomb law according to F. Everhart et al. (Phys. Rev., 99, 1287 (1955)), shows insufficient quantitative agreement, particularly for graphite. The limit scattering angle of 17.5° to be expected for graphite in the laboratory coordinate system was not observed. This indicates that multiple collisions too must be taken into account. There are 4 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: May 18, 1962, by L. A. Artsimovich, Academician

SUBMITTED: May 7, 1962

42703

S/020/62/147/002/009/021
B184/B102

24.7000

AUTHORS: Balarin, M., Molchanov, V. A., Tel'kovskiy, V. G.

TITLE: Anisotropy of the cathode sputtering coefficient and the focused collisions in monocrystals

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 2, 1962, 331-333

TEXT: The angular dependence and the anisotropy of the sputtering coefficient was investigated under the same experimental conditions as used by V. A. Molchanov and V. G. Tel'kovskiy (DAN, 136, 801, 1961) by rotating zinc monocrystals about their <210> axis. The <100> directions are the focusing directions in the basic plane. For the other directions, especially the <210> direction, indirect focusing is possible. A comparison of the two given curves shows that the mean sputtering coefficient is directly proportional to the distance of corresponding atomic layers. The anisotropy of the angular distribution is a function of focused collisions in the crystal. The position of the extrema depends on the focusing direction. There are 3 figures.

Card 1/2

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University imeni M. V. Lomonosov)

PRESENTED: June 19, 1962, by L. A. Artsimovich, Academician

SUBMITTED: June 11, 1962

ACCESSION NR: AP4005398 S/0188/63/000/006/0013/0017

AUTHOR: Mashkova, Ye. S.; Molchanov, V.A.; Faruk, M.A.

TITLE: Angular relationships in small-angle scattering of inert gas ions

SOURCE: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, No. 6, 1963, 13-17

TOPIC TAGS: ion scattering, inert gas ion, fast ion, ion bombardment, surface bombardment, metal target, small angle scattering

ABSTRACT: Data in the literature indicate that by changing the angle of incidence of ions on a target and the velocity of the incident particles it is possible, within certain limits, to change the ratio of the number of particles experiencing single and multiple collision. However, the results of certain studies of the angular distribution of reflected particles do not agree with the results of investigation of the spectra of reflected ions and do not agree with current concepts on the mechanism of the interaction of ions with a solid body. A study, therefore, was made of the angular relationships of reflection of ion beams on metal surfaces. A beam of monoenergetic, singly-charged ions of inert gases (argon and helium) with energies of 30 kev was pro-

Card 1/3

ACCESSION NR: AP4005398

duced in a mass-monochromator. Angular convergence of the beam was plus or minus 1 degree and current density near the focus, where the target was situated, was about 1 ma/centimeter square. Grazing angles ranged from 4 to 26 degrees. Targets were semicrystalline metal specimens (W, Cu, Ti, Ni, Mo, Be) and graphite. Upon reflection from the target a large part of the ions were neutralized. Since the angles of scattering at which the measurements were made were small, the secondary electron emission current was proportional to the number of reflected particles incident on the collector, and the curves of the dependence of the secondary electron emission current on the scattering angle, in the case of a constant grazing angle, described the angular distribution of the reflected particles. Series of curves are given for the dependence of the secondary electron emission currents on the scattering angle for different grazing angles. All have a similar shape, regardless of the ratio of the masses of the incident particles and the atoms of the targets. In the case of small grazing angles the curves have a clearly expressed maximum, after which there is a monotonic drop-off. Increase of the curve to a maximum apparently is related to the microrelief of the specimen. The shape of the curves changes with an increase of the grazing angle: the slope becomes flatter.

Card 2/3

ACCESSION NR: AP4005398

When the targets are bombarded with helium ions, the drop-off occurs more slowly with an increase of the grazing angle than with bombardment with argon ions. The experimental data qualitatively confirm the applicability of a "gas model" of a solid body. Quantitatively, it is difficult to theoretically take into account the relative role of processes of multiple scattering. Experimental methods must be improved. Orig. art. has: 6 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki (Scientific Research Institute of Nuclear Physics)

SUBMITTED: 15Nov62 DATE ACQ: 20Jan64 ENCL: 00

SUB CODE: PH NO REF SOV: 006 OTHER: 006

Card 3/3

MASHKOVA, Ye.S.; MOLCHANOV, V.A.

Value of the effective collision radius in experiments on the sputtering and ion-electron emission of single crystals. Fiz. tver. tela 5 no.8:2383-2384 Ag '63. (MIRA 16:9)

1. Moskovskiy gosudarstvennyy universitet im. Lomonosova.
(Sputtering (Physics))
(Collisions (Nuclear physics))

MASHKOVA, Ye.S.; MOLCHANOV, V.A.; ODINTSOV, D.D.

Anisotropy of the sputtering coefficients and ion-electron emission from single crystals. Fiz. tver. tela 5 no.12:3426-3429 D '63. (MIRA 17:2)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

MASHKOVA, Ye.S.; MOLCHANOV, V.A.; FARUK, M.A.

Angular regularities of the scattering of ions of inert gases at small angles. Vest. Mosk. un. Ser. 3: Fiz., astron. 18 no.6:13-17 N-D '63. (MIRA 17:2)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.

L 13039-63 EWT(1)/EWG(k)/EWP(q)/EWT(m)/BDS/ES(w)-2 ASD/ESD-3/SSD/
AFFTC Pz-4/Pab-4 JD/JG/AT/IJP(C)
ACCESSION NR: AP3001343 S/0057/63/033/006/0766/0768

AUTHOR: Molchanov, V. A.; Soshka, V.; Faruk, M. A.

TITLE: Angular distribution of sputtered tungsten and zinc particles

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 33, no. 6, 1963, 766-768

TOPIC TAGS: cathode sputtering, Wehner effect, W, Zn

ABSTRACT: Discovery of the effect of preferential ejection of particles in close-packed directions from single crystals under ion bombardment is attributed to G. K. Wehner (Phys. Rev., 102, 690, 1956). Subsequent to its discovery there have been many studies of preferential sputtering, but few give the actual angular distribution of the ejected particles. In the present work the authors used a previously described technique (ZhTF, 32, 1032, 1962) to study the angular distributions of ejection from tungsten and zinc single crystals. The deposit is caught on a collector and the spot is scanned on a microdensitometer. The projectiles were 30 keV argon ions. The density distribution over the deposit spot in the [100] direction of a W single crystal is approximated by a Gaussian curve with a half-width of 22°. In case of bombardment of Zn crystals on the basal plane there were obtained six spots in the [101] directions; again the

Card 1/2

L 13039-63
ACCESSION NR: AP3001343

distributions are roughly approximated by Gaussian curves, but with some distortion owing to overlapping of neighboring deposits. The half-widths for individual spots in the /101/ directions of Zn are 24 to 28°. As in the case of cubic crystals there is correlation between the angular distribution of sputtered particles and the "valleys" in the curve characterizing the angular dependence of the sputtering factor. "The authors are grateful to M. W. Thompson (Harwell) for valuable suggestions regarding the procedure utilized for measuring angular distributions." Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 24Dec62 DATE ACQ: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 005 OTHER: 010

Card 2/2

L 10185-63 EWT(1)/EWG(k)/EWP(q)/EWT(m)/BDS/ES(w)-2 AFFTC/ASD/ESD-3/ 80
AFWL/IJP(C)/SSD Pa-4/Pab-4 JD/AT/JG 78
ACCESSION NR: AP3005433 S/0020/63/151/005/1074/1075

AUTHOR: Mashkova, Ye. S.; Molchanov, V. A.; Odintsov, D. D.

TITLE: Anisotropy of the ion-electron emission factor of single crystals

SOURCE: AN SSSR. Doklady*, v. 151, no. 5, 1963, 1074-1075

TOPIC TAGS: ion emission, electron emission, ion electron emission factor, single crystal electron emission, emission factor anisotropy, emission factor angular anisotropy, copper single crystal, (100) face secondary emission

ABSTRACT: A study of the anisotropy of the ion-electron emission factor of single crystals of copper has been carried out. Measurements were obtained of the dependence of the ion-electron emission factor on the angle of incidence (ϕ) of singly charged argon ions (with energies of 20 and 30 kev) striking the (100) face of a single-crystalline copper target. The measurement setup is shown in Fig. 1 of the Enclosure. Secondary electrons emitted by the

Card 1/4

ACCESSION NR: AP3005433

target were attracted by the collector before which a grid was placed to suppress "tertiary" electrons emitted by the collector. The experiment measured the ion current I_0 and current I_1, the latter being the sum of the ion current and the current of secondary-emission particles. The ion-electron emission factor was determined as the ratio of secondary current to the ion current. It was shown that the dependence of the emission factor on the incidence angle is nonmonotonic and that the number of emitted electrons decreases sharply whenever the direction of the primary beam coincided with a main crystal axis of the target. Calculations show that collisions with atoms of the first few layers alone are of substantial significance in electron emission and that the dependence of the number of electrons emitted upon the angle of incidence corresponds to the variation of collision probability. "The authors thank N. I. Zakharov for aid in conducting the experiment." Orig. art. has: 3 figures and 2 formulas.

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet imeni M. V. Lomonosova (Moscow State University)

L 11989-65 EWT(l)/EWG(k)/EWT(m)/EPA(w)-2/EEC(t)/EWP(t)/EEC(b)-2/EWP(b)
Pz-6/Pab-10/Pad IJP(c)/AFWL/SSD/ESD(t) JD/HW/AT
ACCESSION NR: AP4048440 S/0181/64/006/011/3486/3488

AUTHORS: Mashkova, Ye. S.; Molchanov, V. A.

TITLE: Anisotropy of the secondary electron emission coefficient of nickel and zinc single crystals

SOURCE: Fizika tverdogo tela, v. 6, no. 11, 1964, 3486-3488

TOPIC TAGS: nickel, zinc, single crystal, secondary electron, secondary emission, copper

ABSTRACT: Nickel, zinc and copper targets were cleaned by [unspecified] ion bombardment and then subjected to beams of singly-charged argon ions having energies of 20, 30 and 36 keV. The residual gas pressure in the bombardment chamber was not higher than 2×10^{-7} mm Hg. The accuracy of the results was ±10% and the reproducibility about 3%. The dependences of the secondary electron emission coefficient γ on the angle of incidence of ions (φ), obtained by rotating

Card 1/3

the (100) face of a nickel single crystal about an edge of this face (the <100> axis) and by irradiating a plane of copper single crystal cut at 20° to (100) face, were similar to the sputtering coefficient curve for a corresponding rotation of the (100) face of a copper single crystal (A. V. Molchanov and V. G. Tel'kovskiy, Izv. AN SSSR, ser. fiz. v. 26, 1359, 1962). The sharpest minima for nickel and copper were observed when the ion beam direction coincided with the <100> and <110> axes. The $\gamma(\varphi)$ curves for a zinc single crystal rotated about the axes $\langle 10\bar{1}0\rangle$ and $\langle 1\bar{2}10\rangle$ with the ions incident on the basal plane, repeated qualitatively the form of the corresponding curve for the sputtering coefficient (M. Balarin, V. A. Molchanov, and V. G. Tel'kovskiy, DAN SSSR, v. 147, 331, 1962; V. A. Molchanov, V. Soshka, and M. A. Faruk, ZhTF, v. 33, 776, 1963). The anisotropy decreased when the incident ion energy decreased. The absolute values of the secondary electron emission coefficient varied with the energy E of the incident ions approximately as $\sqrt{E}$. Orig. art. has: 2 figures.

L 11989-65
ACCESSION NR: AP4048440

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 20Mar64 ENCL: 00

SUB CODE: SS, IC NR REF SOV: 005 OTHER: 004

Card 3/3

L 45540-65 EWT(l)/EWG(k)/EWP(m)/EPA(sp)-2/EPF(c)/EPF(n)-2/EPA(w)-2/
EWP(t)/T/EWP(b)/EWA/EWP(b)/EWA(m)-2 Pn-5/Pab-10/Pr-4/Pu-4 IJP(c)/
ESD(t)/ESD(gs)/ASD(a)-5/AS(mp)-2 JD/AW/AT

ACCESSION NR: AP5000675 S/0181/64/006/012/3704/3705

AUTHORS: Yashkova, Ye. S.; Molchanov, V. A. B

TITLE: Influence of thermal lattice vibrations on the anisotropy of the ion-electron emission coefficient of single crystals 14

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3704-3705

TOPIC TAGS: thermal lattice vibration, anisotropy, thermal vibration, ion emission, electron emission, single crystal

ABSTRACT: To check whether an increase in the temperature of a single crystal would change the anisotropy of the ion-electron emission from its surface, the authors investigated the emission from the (100) face of single-crystal copper, rotated about the [110] axis. The experiment was similar to that described by the authors elsewhere (with D. D. Odintsov, DAN SSSR v. 151, 1071, 1963). The bombarding argon ions had an energy 30 keV, and the

Card 1/2

L 16340-65

ACCESSION NR: AP5000673

sample was heated with a nichrome coil. The heater was placed inside a copper collector whose walls were cooled with liquid nitrogen. The residual pressure did not exceed 2 x 10^{-7} mm Hg. The temperature was measured with a thermocouple placed on the surface of the sample, the maximum surface temperature reaching 900C. The results had shown that with increasing target temperature the ion-electron emission coefficients increase at the minima, decrease at the maxima, and the entire curve as a whole becomes smoothed out, especially at the maximum temperature. "The authors are grateful to V. Soshka for help with the experiment." Orig. art. has: 1 figure.

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 25Jun64 ENCL: 00

SUB CODE: SS,NP NR REF SOV: 002 OTHER: 001

Card 2/2

L 12921-65 EWT(l)/EWT(m)/EPF(c)/EPA(w)-2/EEC(t)/T/EWP(t)/EWP(b)/EWA(m)-2
PAB-10/PF-4 ESD(gs)/ESD(t) JD/JW SSD/ASD(a)-5/AFWL/ S/0048/64/028/009/1409/1410
ACCESSION NR: AP4045290

AUTHOR: Kvlividze, V.A.; Meshkova, Ye.S.; Molchanov, V.A.

TITLE: Angular regularities evinced in the interaction of ion beams with the surface of a single crystal /Report, Tenth Conference on Cathode Electronics held in Kiev, 11-18 Nov 1963/

SOURCE: AN SSSR, Izvestiya. seriya fizicheskaya, v.28, no.9, 1964, 1409-1410

TOPIC TAGS: cathode sputtering, secondary emission, single crystal, copper, argon

ABSTRACT: The sputtering coefficients and ion-electron emission coefficients were measured for 30 keV argon ions incident on the (110) face of a single crystal of copper at angles from 0 to 76°. The experimental technique has been described elsewhere by V.A.Molchanov and various collaborators (Dokl.AN SSSR,136,801,1961; 151, 1074,1963; Fiz.tverdogo tela 5,3426,1963). Measurements were made both with the beam rotating about the [112] axis, and about the [111] axis, both of which lie in the target face. In both cases the curves for the two quantities measured were found to be very similar. Minima were found to occur when the incident beam was parallel to the [110], [113], [120], and [123] axes. Numerous methods for calcula-

1/2

L 12921-65
ACCESSION NR: AP4045290

ting the dependence of the sputtering coefficient on the angle of incidence are discussed very briefly. A theoretical curve due to D.D.Odintsov (Fiz.tverdogo tela 4, 3425,1963) is compared with the experimental curve obtained by rotating the beam about the [111] axis, and good qualitative agreement is found. Orig.art.has: 2 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Scientific Research Institute of Nuclear Physics, Moscow State University)

SUBMITTED: 00 ENCL: 00

SUB CODE: EC,SS NR REF SOV: 007 OTHER: 005

2/2

L 19021-65 EWT(l)/EWG(k)/EWT(m)/EPA(sp)-2/EPF(c)/EPF(n)-2/EPR/EPA(w)-2/T/EWP(t)/EWA/EWP(b) Pr-4/Ps-4/Pu-4/Pz-6/Pab-10/Pad IJP(c)/ASD(m)-3/ASD(a)-5/SSD/AFWL/BSD/ASD(f)-2/ASD(p)-3/AS(mp)-2/ESD(ga)/ESD(t) AT/JD/HW/JG

ACCESSION NR: AP4049053 S/0057/64/034/011/2081/2082

AUTHOR: Mashkova, Ye.S.; Molchanov, V.A.

TITLE: Angular regularities in sputtering and ion-electron emission at large angles of incidence of the ions onto the target

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.11, 1964, 2081-2082

TOPIC TAGS: ion bombardment, sputtering, electron emission, copper, tungsten, nickel, molybdenum, argon

ABSTRACT: The sputtering and ion-electron emission coefficients of copper, tungsten, nickel and molybdenum for approximately 30 keV argon ions were measured at angles of incidence of the ions onto the target from 60° to 86°. The experimental conditions have been described elsewhere (Ye.S.Mashkova, V.A.Molchanov and D.D.Odintsov, FTT 5,3426,1963; DAN SSSR 151,1074,1963). In each case the sputtering coefficient exhibited a maximum as a function of angle of incidence within the range investigated, and the electron emission coefficient increased monotonically with increasing angle of incidence. It is concluded that the presence of a maximum in the sputtering coefficient curve is due to displaced lattice atoms that do not par-

1/2

L 19021-65

ACCESSION NR: AP4049053

O

ticipate in the production of secondary electrons. The decrease of the sputtering coefficient at large angles of incidence is ascribed to the escape of primary recoil target atoms before they can initiate focused cascades of secondaries. Orig. art.has: 1 figure.

ASSOCIATION: none

SUBMITTED: 04Apr64 ENCL: 00

SUB CODE: NP, SS NR REF SOV: 005 OTHER: 003

2/2

MOLCHANOV, V.A.; SOSHKA, V.

Energy spectra of ions scattered by polycrystalline surfaces within small angles. Dokl. AN SSSR 155 no.1:70-71 Mr '64. (MIRA 17:4)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova. Predstavleno akademikom L.A.Artsimovichem.

L 38614-65 EWT(1)/EPA(sp)-2/EPF(c)/EPA(w)-2/EEC(t) Pab-10/Pr-4/Peb WW/AT
ACCESSION NR: AP5005309 S/0181/65/007/002/0619/0621

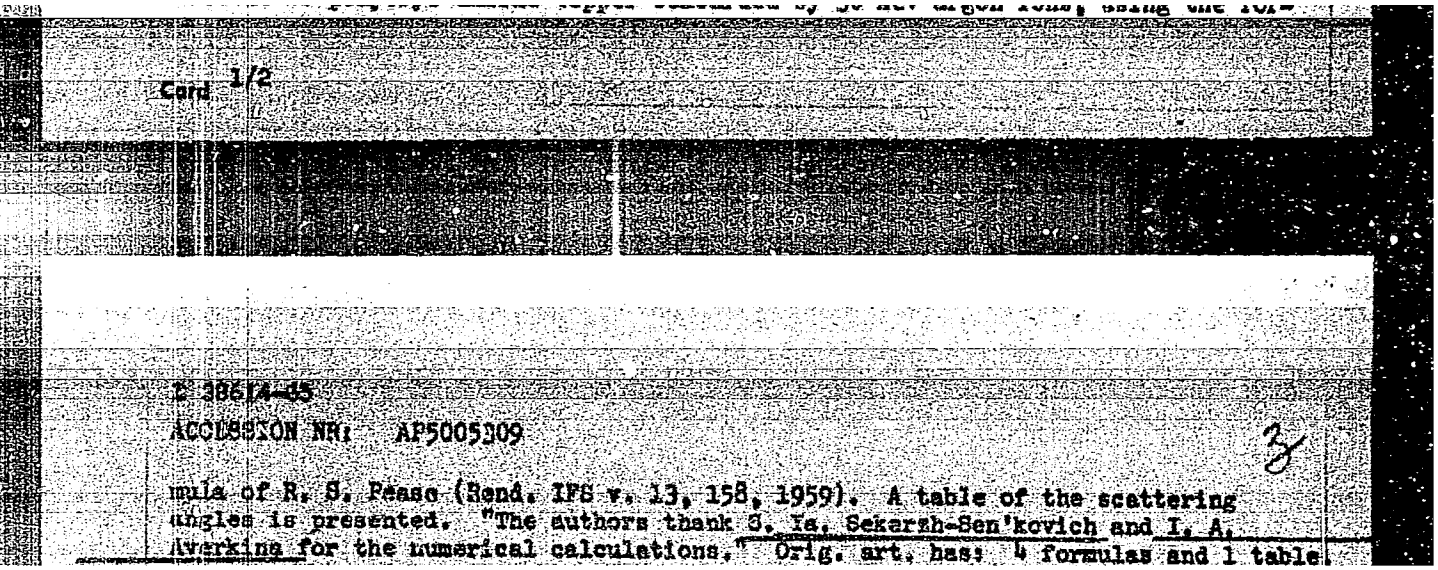
AUTHOR: Kvlividze, V. A.; Mashkova, Ye. S.; Molchanov, V. A.

TITLE: Concerning the scattering of ions by metallic surfaces

SOURCE: Fizika tverdogo tela, v. 7, no. 2, 1965, 619-621

TOPIC TAGS: ion scattering, metal sputtering, scattering angle, angular distribution, sputtering coefficient, copper

ABSTRACT: Results are presented of a numerical calculation of the dependence of the scattering angle on the impact parameter over a wide range of energies, using the potential of L. B. Firsov (ZhETF v. 33, 696, 1957). It is assumed in this

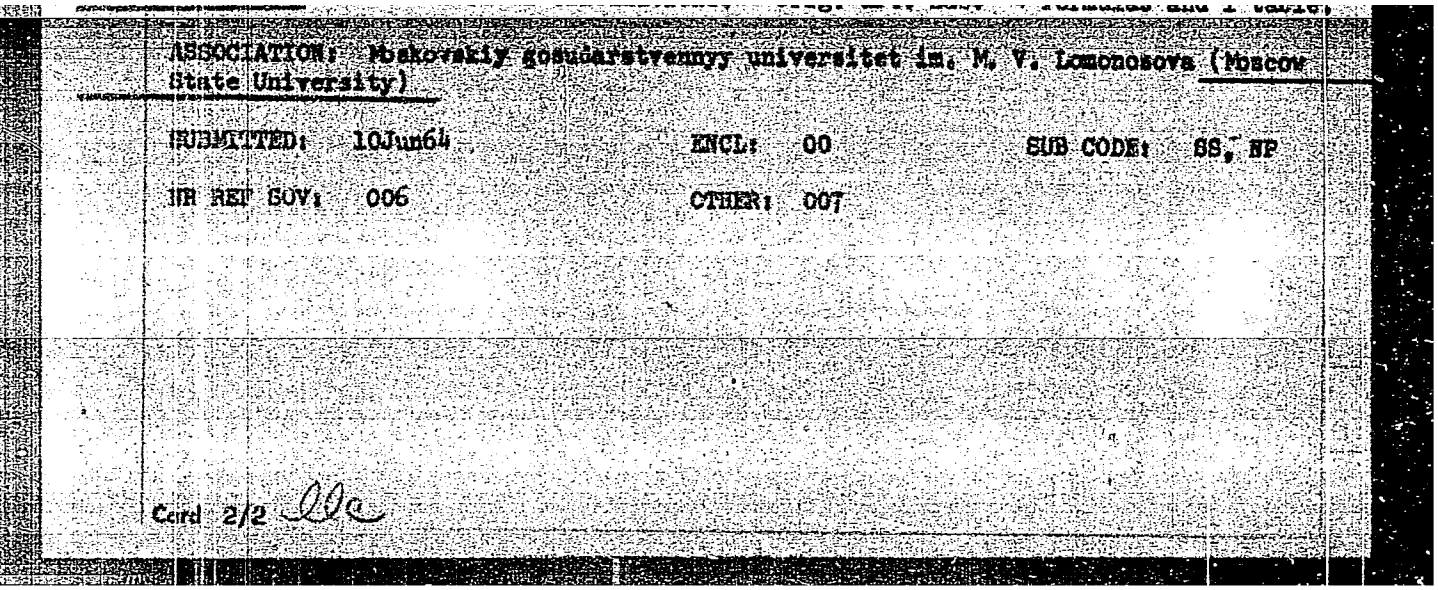


Card 1/2

L 38614-65

ACCESSION NR: AP5005309

mula of R. S. Pease (Rand. IFS v. 13, 158, 1959). A table of the scattering angles is presented. "The authors thank S. Ia. Sekerzh-Sen'kovich and I. A. Averkina for the numerical calculations." Orig. art. has: 4 formulas and 1 table.



ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 10Jun64 ENCL: 00 SUB CODE: GS, NP

NR REF SOV: 006 OTHER: 007

Card 2/2

L 2513-66 EWT(1)/T IJP(c) GG

ACCESSION NR: AP5014595 UR/0181/65/007/006/1872/1874

AUTHOR: Mashkova, Ye. S.; Molchanov, V. A. 44,55

TITLE: On the influence of the crystal structure of the target on the energy spectra of scattered ions 21, 44, 55

SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1872-1874

TOPIC TAGS: neon, copper, crystal lattice structure, ion bombardment, spectrum analysis, energy scattering, ion energy

ABSTRACT: The authors report results obtained in the study of the scattering of singly-charged 30 keV neon ions by copper-crystal targets of different orientations. The measurement procedure was described earlier (DAN SSSR v. 161, 4, 1965). The results show that sharp peaks appear in the spectra when the analyzer axis is close to one of the principal crystallographic axes of the target. The resolution of the copper and neon peaks is better than that of obtained in the scattering of argon by similar targets in the earlier investigation. The reason for the better resolution of the peaks is probably the fact that when the neon ions are scattered by the copper atoms, the latter receive less energy than when argon ions are scattered, so that the peaks of the copper and the neon are farther from one another. At the

Card 1/2

L 2513-66

ACCESSION NR: AP5014595

3

same time, the peaks of Cu^2 and Ne^3 become superimposed and cannot be resolved. Orig. art. has: 2 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

44,55

SUBMITTED: 10Dec64 ENCL: 00 SUB CODE: SS ,NP

NR REF SOV: 002 OTHER: 002

PC

Card 2/2

L 26640-66 EWT(1)/EWT(m)/T/EWP(t) IJP(c) JD/JG/AT

ACC NR: AP5025365 SOURCE CODE: UR/0181/65/007/010/2921/2924

AUTHOR: Mashkova, Ye. S.; Molchanov, V. A.; Soshka, V.; Faruk, M. A. 58 B

ORG: Moscow State University im M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Scattering of ions from alloy surfaces

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 2921-2924

TOPIC TAGS: argon, ion emission, copper, silver, copper alloy, silver alloy, neon, particle scatter, emission spectrum, crystal lattice, particle collision

ABSTRACT: The energy spectra were investigated during scattering of ions of argon and neon (30 kev energy) by targets from copper, silver and copper-silver alloy in order to investigate a number of questions: (1) on the limits of applicability of a concept of collision pairing and on consideration of the atom combination in the crystal lattice; (2) on the role of the nonelastic loss of energy in a range lower than Bohr's adiabatic criteria; (3) on the relative role of multiple collisions in various processes of ion interaction with solid substances. Results obtained are confirmed on the basis of paired collision

Card 1/2

L 26640-66

ACC NR: AP5025365

approximations. Orig. art. has: 3 figs.

SUB CODE: 20,11/ SUBM DATE: 31Mar65/ ORIG REF: 006/ OTH REF: 005

Car 2/2

L 10928-65 EEC(b)-2/EWA(c)/EWT(1)/EWT(m)/EWP(b)/T/EWP(t) IJP(c) GG/JD

ACCESSION NR: AP5007312 S/0057/65/035/003/0575/0576

34
B

AUTHOR: Mashkova, Ye.S.; Molchanov, V.A.

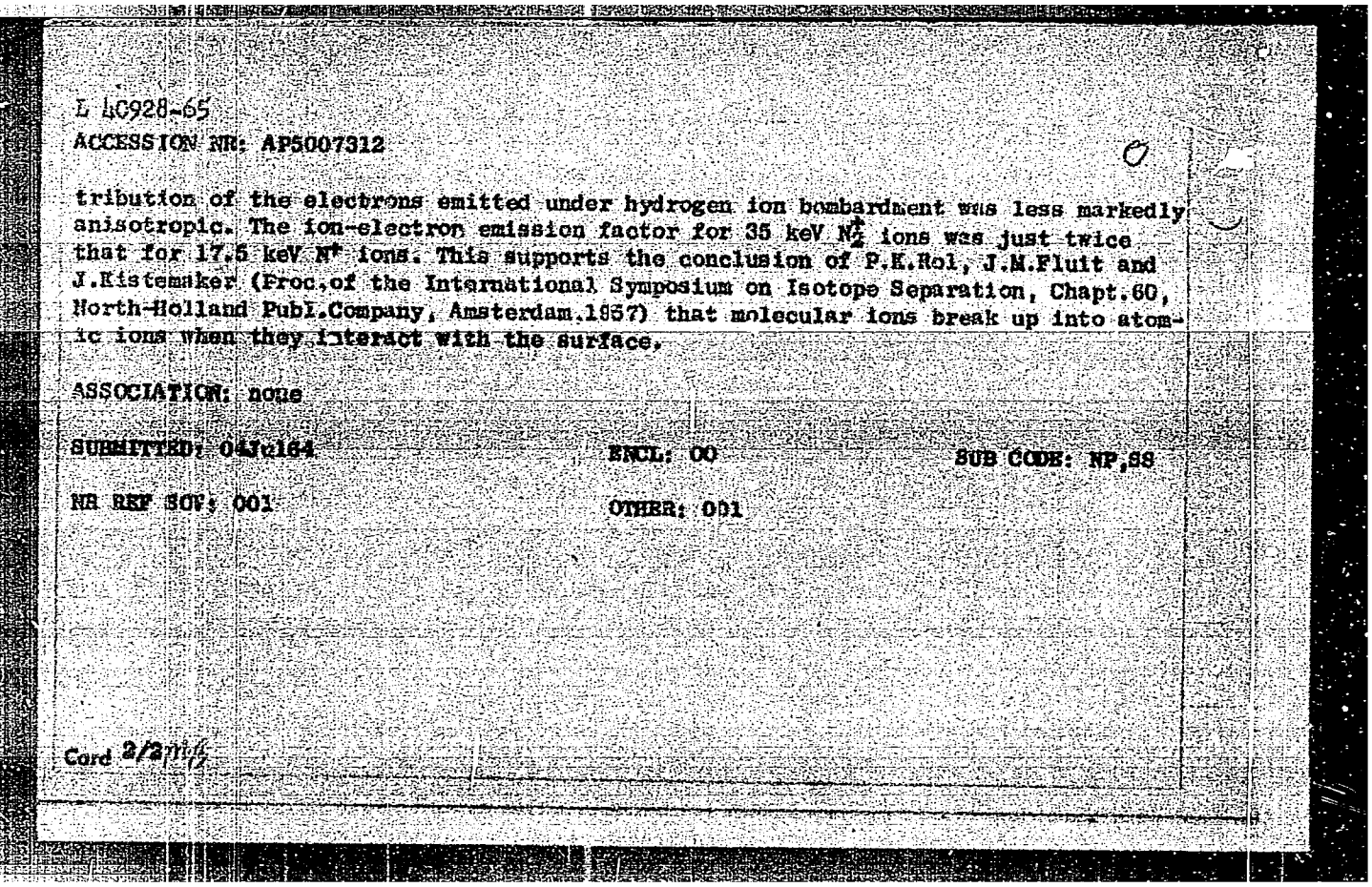
TITLE: On the anisotropy of the ion-electron emission coefficient of a copper single crystal

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.3, 1965,575-576

TOPIC TAGS: electron emission, ion bombardment, single crystal, copper, anisotropy, molecular ion, nitrogen, hydrogen

ABSTRACT: The authors, in collaboration with D.D.Odintsov (DAN SSSR 151,1074,1963) have previously shown that the electrons emitted from a copper surface under bombardment with argon ions are anisotropically distributed. They have now bombarded the (100) face of a copper crystal (cleaned by prolonged heating at 500°C) with 17.5 and 35 keV N^+ and N_2^+ ions and with 15 and 30 keV H^+, H_2^+ and H_3^+ ions, and have determined the angular distributions of the emitted electrons. The experimental technique, except for the method of cleaning the crystal surface, was the same as that employed in the previous work. The electrons ejected by nitrogen ion bombardment were distributed in much the same way as those ejected by argon ions. The dis-

Card 1/2



L 40928-65
ACCESSION NR: AP5007312

tribution of the electrons emitted under hydrogen ion bombardment was less markedly anisotropic. The ion-electron emission factor for 35 keV N_2^+ ions was just twice that for 17.5 keV N^+ ions. This supports the conclusion of P.K.Rol, J.M.Fluit and J.Kistemaker (Proc.of the International Symposium on Isotope Separation, Chapt.60, North-Holland Publ.Company, Amsterdam,1957) that molecular ions break up into atomic ions when they interact with the surface.

ASSOCIATION: none

SUBMITTED: 04Jun64 ENCL: 00 SUB CODE: NP,SS

NR REF SOV: 001 OTHER: 001

Card 2/2

L 52013-65 EPF(c)/EPA(w)-2/ENT(l)/EEC(t)/EPA(sp)-2 Pc-4/Pab-10/Pah AT

ACCESSION NR: AP5013066 UR/0057/65/035/005/0963/0963

29
B

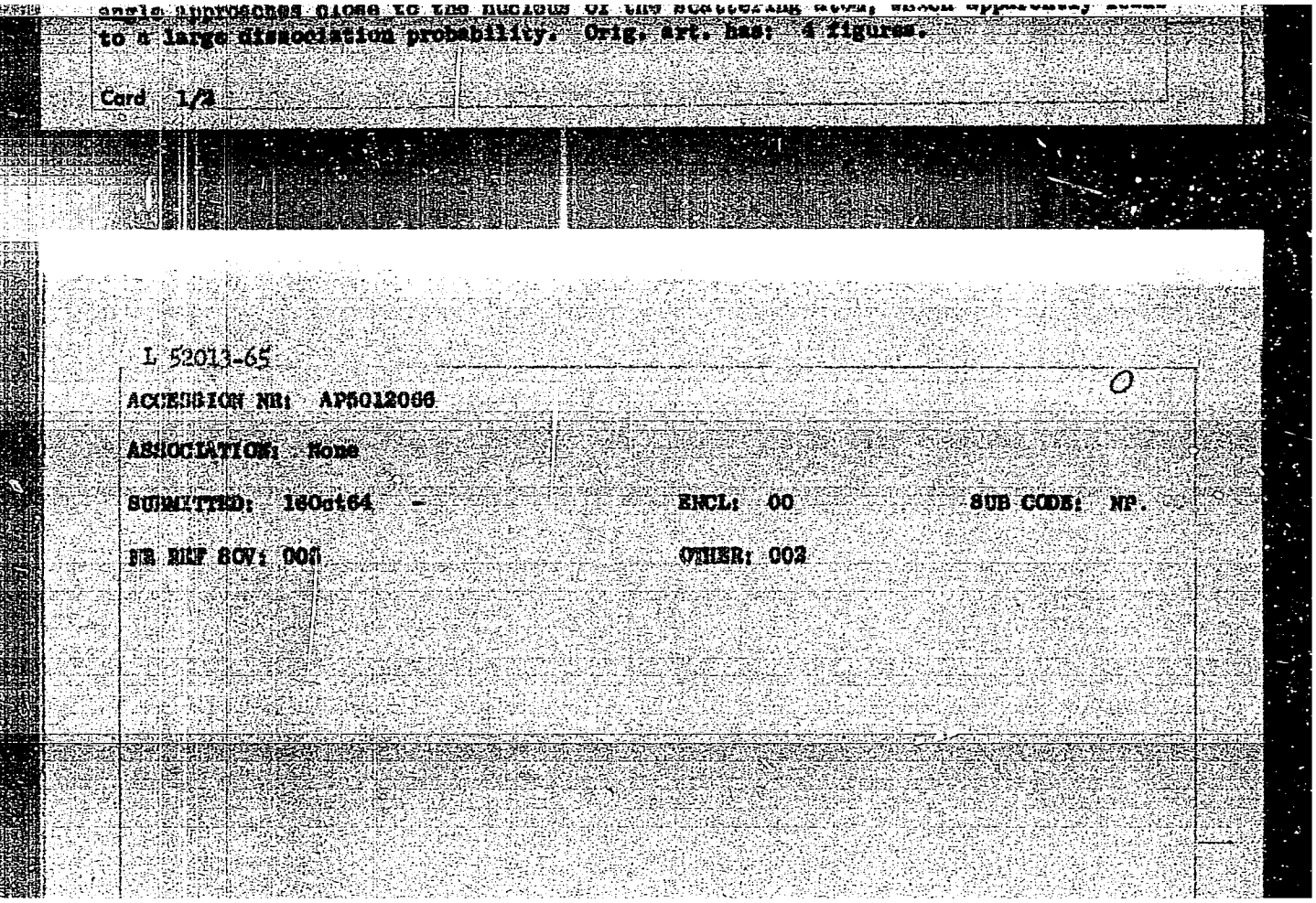
AUTHOR: Molchanov, V.A., Soshka, V.

TITLE: On the dissociation of molecular ions during interaction with a solid surface

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 5, 1965, 963

TOPIC TAGS: ion scattering, ion dissociation, molecular ion, nitrogen, copper

ABSTRACT: The ions scattered at 10°, 15°, 20° and 38° by a polycrystalline copper target from a beam of 30 keV nitrogen ions incident on it at 5° were investigated by a method that the authors have described elsewhere (DAN SSR, 155, 70, 1964). At the small scattering angles nitrogen molecule ions were present, as well as singly and doubly charged atomic ions. As the scattering angle increased the relative number of molecule ions decreased, and at the largest scattering angle none were perceptible. This behavior is explained by the fact that large scattering angles correspond to small impact parameters: an ion that is scattered through a large angle approaches close to the nucleus of the scattering atom, which apparently leads



to a large dissociation probability. Orig. art. has: 4 figures.

Card 1/2

L 52013-65

ACCESSION NR: AP5012066

ASSOCIATION: None

SUBMITTED: 16Oct64 ENCL: 00 SUB CODE: NP.

NR REF SOV: 001 OTHER: 002

L 4(3)58-65 EWT(1)/EWT(m)/EPA(sp-2/EPF(c)/EPF(n)-2/EPA(w)-2/EWP(t)/EWP(b)
Pr-4/Pe-4/Reb/Pu-4 IJP(c) JD/AT

ACCESSION NR: AP5018316 UR/0057/65/035/007/1321/1323

38
36
B

AUTHOR: Mashkova, Ie. S.; Molchanov, V. A.

TITLE: Concerning angular regularities in the small angle scattering of inert gas ions

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 7, 1965, 1321-1323

TOPIC TAGS: ion scattering, small angle scattering, argon, neon, copper

ABSTRACT: The authors have investigated the scattering of 30 keV A^+ and Ne^+ ions from a polycrystalline copper surface at scattering angles from 5 to 28°, employing as a detector an electrostatic analyzer that has been described elsewhere (V.A.Molchanov and V.Soshka, DAN SSSR, 155, 70, 1964). The investigation was undertaken to obviate possible criticism of their earlier work (DAN SSSR, 146, 558, 1962; Vestn. MGU, ser. fiz.-astr., No.6, 13, 1963) in which ions that were neutralized in the scattering were detected with a secondary electron emission instrument, although they have previously shown (FTT, 7, 619, 1965) that the energy dependence of the secondary emission coefficient and fast sputtered target atoms could not have given rise to significant errors. The scattered ion spectra consisted of narrow peaks corresponding to singly, doubly, and triply

Card 1/2

L 60358-65

ACCESSION NR: AP5018316

charged ions. The angular dependence of the intensity of the singly charged ion peak agreed with that obtained in the previous work for ions that were neutralised in the collision. The energies of the scattered ions were close to the energy expected for an ion that had undergone a single collision with a target atom. The number of ions that increased their charge in the scattering was an order of magnitude less than the number of those that were scattered without change of charge, and the number of sputtered target atoms that became ionized was small compared with the number of ions that were scattered with loss of charge. "The authors thank N.V.Fedorenko for a discussion at the Third Conference on Atomic Collisions of scattering of ions by solids". Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 14Oct64 ENCL: 00 SUB CODE: NP, SS

NO REF SOV: 005 OTHER: 001

Card 2/2

MOLCHANOV, V.A.

Focusons in crystals. Priroda 54 no.7:66-71 Jl '65.
(MIRA 18:7)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta im. M.V.Lomonosova.

L 07060-65 EWT(1)/T IJP(c) GG

ACCESSION NR: AP5010829 UR/0020/65/161/004/0813/0816

AUTHOR: Mashkova, Ye. S.; Molchanov, V. A.; Soshka, V.

TITLE: The effect which the crystal structure of the target has on the energy spectra of scattered ions

SOURCE: AN SSSR. Doklady, v. 161, no. 4, 1965, 813-816

TOPIC TAGS: particle scattering, copper, irradiation, ion beam, particle spectrum

ABSTRACT: The ordering of atoms in the target has a considerable effect on many processes which take place when the surfaces of solids are irradiated by ion beams. For this reason the authors studied the effect which the crystal structure of the target has on the energy spectra of scattered ions. Copper crystal targets with various orientations were irradiated with singly charged 30 kev argon ions. The targets and analyzer were rotated around axis <110> lying in the plane of the target. The energy spectra of ions scattered by the (100) face of the crystal are shown in fig. 1 of the Enclosure. Fig. 2 of the Enclosure shows the energy spectra of the ions when the shear plane of the target was at an angle of 18° with crystallographic plane (100). The difference between these spectra is explained. In the first case (irradiation of face (100)), the main crystallographic axis of

Card 1/4

L 63060-65

ACCESSION NR: AP5010829

6

the target never coincidea with the direction of the analyzer axis. The only exception is the <110> axis which lies in the plane of the target. But in this axial direction (i.e. parallel to the surface of the target) scattered particles and primary displaced atoms of the target cannot be propagated because of the microscopic surface configuration. In the second case, axis <110> of the target coincides with the axis of the analyzer at a scattering angle of 28° and a Bragg angle of 10°. It is obvious that in this case there are sharply defined copper peaks in the energy spectrum, and the vertex of the A^+ peak is narrower than at these same scattering and Bragg angles in the first case. However, it should be noted that this type of spectrum is observed not only in the case where the <110> axis coincides exactly with the analyzer axis, but within a certain range of scattering and Bragg angles. These energy spectra show that the crystal structure of the target has a considerable effect on the scattering of ions. "The authors express deep gratitude to Professor I. Kistemaker for discussing the problem of ion scattering by crystals."

Orig. art. has: 2 figures.

[illegible]

NO REF SOV: 007 OTHER: 010

Card 2/4

L 65060-65
ACCESSION NR: AP5010829

ENCLOSURE: 01

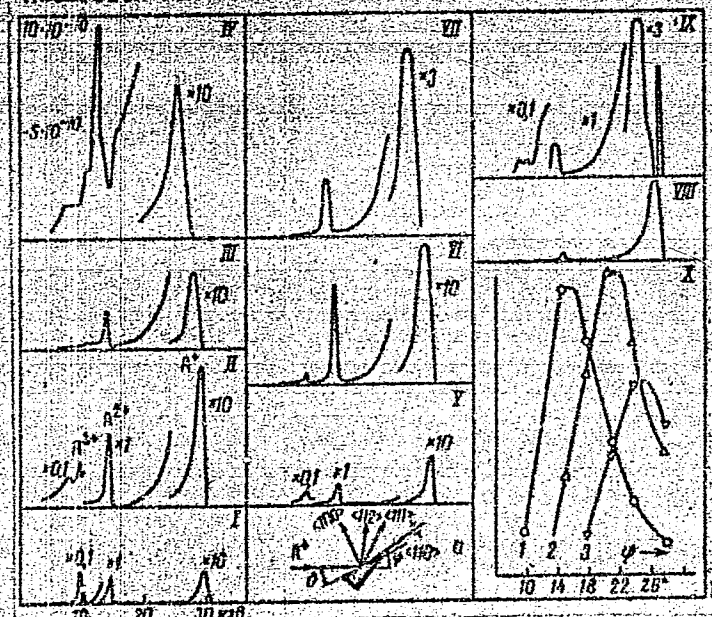


Fig. 1. Shear plane of the target coincides with face (100). Bragg angles θ, and scattering angles φ are: I--θ=5°, φ=10°; II--θ=5°, φ=15°; III--θ=5°, φ=20°; IV--θ=5°, φ=28°; V--θ=10°, φ=15°; VI--θ=10°, φ=20°; VII--θ=10°, φ=28°; VIII--θ=15°, φ=20°; IX--θ=15°, φ=28°. At the right is the 30 kev A^+ line without a target at φ=0°. X--intensity of peak A^+ as a function of the scattering angle at various Bragg angles: 1--5°; 2--10°; 3--13°, a--diagram of ion source position, analyzer and crystallographic axes of the target.

Card 3/4

L 65060-65

ACCESSION NR: AP5010029

ENCLOSURE: 02

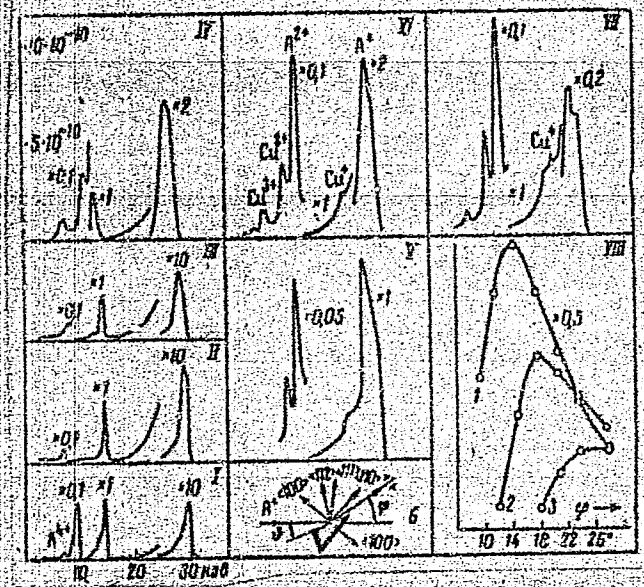


Fig. 2. Shear plane of the target at an angle of 18° to face (100): I--θ=5°, φ=10°; II--θ=5°, φ=15°; III--θ=5°, φ=20°; IV--θ=5°, φ=28°; V--θ=20°, φ=28°; VI--θ=10°, φ=28°; VII--θ=15°, φ=28°; VIII--intensity of A^+ peak as a function of scattering angle at various Bragg angles: 1--5°; 2--10°; 3--15°, b--positions of the ion beam, analyzer and crystallographic axes of the target.

Card 4/4

L 00897-67 EWP(1)/EWP(m)/EWA(b)/EWT(m) IJP(c) AP/JD
ACC NR: AP6033553 SOURCE CODE: UR/0181/66/008/010/2939/2944

AUTHOR: Yevdokimov, I. N.; Molchanov, V. A.; Odintsov, D. D.; Chicherov, V. M.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Effect of thermal fluctuations in a crystal lattice on the coefficient of ion-electron emission

SOURCE: Fizika tverdogo tela, v. 8, no. 10, 1966, 2934-2944

TOPIC TAGS: crystal, crystal lattic, ion emission, electron emission, monocrystal, polycrystal, copper

ABSTRACT: The dependence of the coefficient of ion-electron emission γ on the angle of incidence ϕ of ions on a target at 200 and 900C was investigated for various orientations of a copper monocrystal and for a polycrystal copper target under bombardment by $^{20}Ne^+$, $^{40}A^+$, $^{84}Kr^+$ ions with an energy of 30 kev. The polycrystal target was found to have an almost constant value at different target temperatures (at the same angle of ion incidence on the target). An increase in monocrystal target temperature results in a smoothing out of anisotropy in the coefficient of emission. Furthermore, the change in the form

Card 1/2

L 09897-67
ACC NR: AP6033553

of the curve is different for different orientations of the target. The authors show that the results obtained are accurately described by the transparency model. The authors thank Ye. S. Mashkov for his assistance in conducting the experiments and for discussing the results obtained, and Yu. V. Martynenko for his discussion of the results. Orig. art. has: 2 figures. [Author's abstract]

SUB CODE: 20/ SUBM DATE: 23Feb66/ ORIG REF: 003/ OTH REF: 005

Card 2/2

ACC NR: AP7003897 SOURCE CODE: GE/0030/67/019/001/0407/0415

AUTHOR: Evdokimov, I. N.; Mashkova, E. S.; Molchanov, V. A.; Odintsov, D. D.

ORG: Scientific Institute of Nuclear Physics, Moscow State University

TITLE: Dependence of the ion-electron emission coefficient on the angle of incidence

SOURCE: Physica status solidi, v. 19, no. 1, 1967, 407-415

TOPIC TAGS: ion emission, electron emission, ion electron emission, incidence angle

ABSTRACT: A study was made of the dependence of the coefficient of ion-electron emission on the angle of incidence of a graphite target and polycrystalline metal (Cu, Ag, Mo. Zr, W, Bi) targets, bombarded with inert gas and nitrogen ions at 25--30 kev. The application of a magnetic field parallel to the axis of rotation shows that both the positive and negative ion currents to the collector are negligibly small. The emission coefficient increases with an increase in the angle of incidence

Card 1/2

ACC NR: AP7003897

up to about 80 to 85°. Up to a certain angle (between 36 to 81°, depending on the ion-target combination) the angular dependence may be approximated by a reciprocal cosine law; for larger angles the variation is somewhat slower. Comparisons are made with calculations based on the transparency model. Orig. art. has: 4 figures and 1 table. [Authors' abstract]

[DW]

SUB CODE: 20/SUBM DATE: 01Aug67/ORIG REF: 001/OTH REF: 011/

Card 2/2

L 37688-66 EEC(k)-2/EWP(k)/EWT(1)/EWT(m)/FBD/T/EWP(e)/EWP(t)/ETI IJP(c)
ACC NR: AP6025255 WH/WG/JD/JG SOURCE CODE: UR/0057/66/036/007/1269/1272

AUTHOR: Bonch-Bruyevich, A. M.; Imas, Ya. A.; Molchanov, V. A.; Pavlenko, N. A.

ORG: none

TITLE: A neodymium glass laser with a rectangular cross-section rod

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 7, 1269-1272

TOPIC TAGS: solid state laser, paramagnetic laser, neodymium glass laser, laser r and d / GSI-1 laser, GSI-1M laser

ABSTRACT: A rectangular-rod neodymium glass laser described by the authors elsewhere (ZhPS, 1, 1, 45-50, 1964) was produced with slight modifications and marketed under the industrial designation GSI-1 (Fig. 1). The GSI-1 is being used currently for scientific research and in the solution of certain technological problems. Its characteristics are essentially the same as those of the laser described earlier, provided the same glasses and resonator mirrors are used. The marked disadvantages of the GSI-1 are the comparatively low effectiveness of its eight IFK-2000 standard flashlamps and its consequent low efficiency (0.3—0.4%), and the saturation of the lamp characteristics. These disadvantages were partly remedied when a rectangular cross-section spiral flashlamp was used instead of the IFK-2000 lamp. This led to a twofold increase in the laser efficiency and increased pulse energy of up to 100 j.

Card 1/4

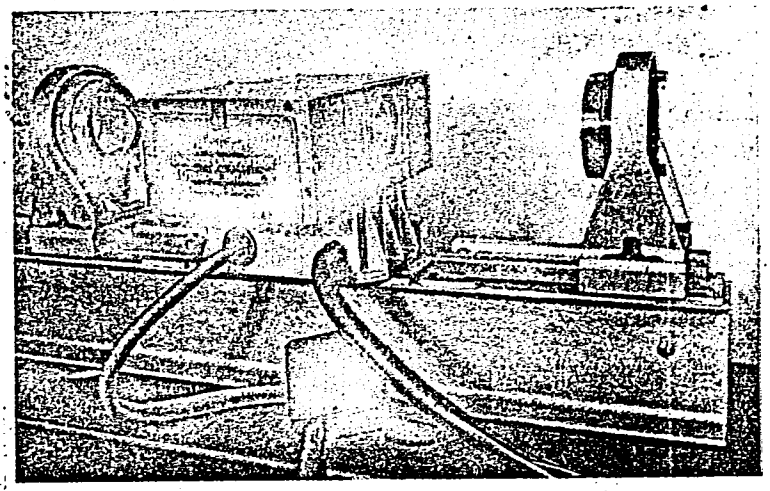


Fig. 1. External view of the GSI-1 laser

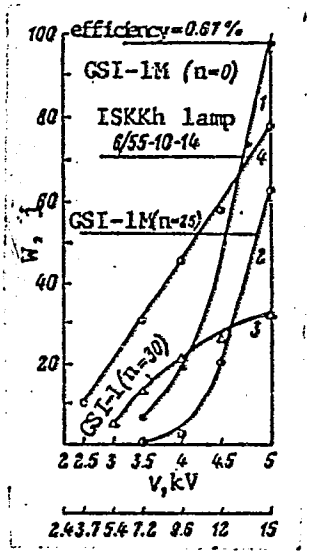


Fig. 2. Dependence of laser (GSI-1 and GSI-1M) output pulse on the pump energy

The present article deals with the GSI-1 laser and its modified version, GSI-1M. The output pulse energy of each laser was shown as a function of the pumping energy (Fig. 2).